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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,775	04/06/2006	Sougo Ohta	071971-0460	2530
53080 7590 11/01/2007 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, NW WASHINGTON, DC 20005-3096			EXAMINER HSIEH, HSIN YI	
			ART UNIT 2811	PAPER NUMBER
			MAIL DATE 11/01/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/574,775

Applicant(s)

OHTA ET AL.

Examiner

Hsin-Yi (Steven) Hsieh

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


LYNNE GURLEY
SUPERVISORY PATENT EXAMINER
AN 2811, TC 2800

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20060406

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper." Therefore, the references cited in the Search Report have not been considered. Applicant is advised that the date of submission of any item of information or any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

2. The information disclosure statement filed 04/06/2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 406, 407, 408, and 409. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. Figures 7-13 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37

CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of “an interlayer insulating film formed on the pixels; and a microlens formed on a part of the interlayer insulating film located immediately above the photodiode” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:
7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Solid state imaging apparatus including MOS transistors.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
9. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
10. Claim 1 recites the limitation "one end" in the 9th line of the claim and does not specify whether this limitation refers to the end of the reset transistor or the end of the gate electrode of the reset transistor.
11. Claim 1 recites the limitation "the other end" in the 9th and 10th lines of the claim. There is insufficient antecedent basis for this limitation in the claim.
12. Claim 3 recites the limitation "the direction of alignment" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim. The pixels have to be aligned first, then the direction of alignment is meaningful, while the pixels in claim 3 are not previously claimed as being aligned.

13. Claims 2 and 4-7 are rejected because they depend on the rejected claim 1.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. **Claims 1-5** are rejected under 35 U.S.C. 102(b) as being anticipated by Guidash (US 6,657,665 B1) as can be understood since claims 1-7 have been rejected under 35 U.S.C. 112.

16. Regarding **claim 1**, Guidash teaches a solid-state imaging apparatus (image sensor; Abstract) comprising a plurality of pixels (10; Fig. 4, col. 3 line 48) including adjacent first (the bottom of the two 10s; Fig. 4) and second pixels (the top of the two 10s; Fig. 4), the first and second pixels including photodiodes (photodiode photodetectors 12; Fig. 4, col. 3 lines 57-58) formed on a substrate (Abstract) to convert light into signal charges and accumulate the signal charges (this is the function of the photodiodes), transfer transistors (the transistors formed with the transfer gate 23; Fig. 4, col. 3 line 58) having gate electrodes (transfer gate 23; Fig. 4, col. 3 line 58), respectively, and reading out the signal charges accumulated in the photodiodes (this is the function of the transfer gate transistors), and floating diffusions (25; Fig. 4, col. 3 line 58) formed in regions of the substrate located to respective one sides of the gate electrodes (23) of the transfer transistors (see Fig. 4) to convert the signal charges read out by the transfer transistors into electric potential (this is the function of the floating diffusion region), respectively, wherein the first pixel (the bottom one of the 10s; Fig. 4) further includes a reset

transistor (14; Fig. 4, col. 3 line 59) having a gate electrode (reset gate 15; Fig. 4, col. 3 line 58), connected at one end to the photodiodes of the first and second pixels (the one source/drain end of the reset gate 15 is connected to the photodiode through 25 and 23; see Fig. 4) and supplied at the other end with a power voltage (the other source/drain of the reset gate 15 is supplied with Vdd; see Fig. 4), and the second pixel (the top one of the 10s; Fig. 4) further includes an amplifier transistor (source follower input signal transistor 21; Fig. 4, col. 3 lines 59-60) having a gate electrode (SIG; Fig. 4) connected to the transfer transistors of the first and second pixel (SIG is connected to transfer transistors through 44 and 25) amplifying the electric potential into which the signal charges are converted in the associated floating diffusion (this is the function of the source follower input signal transistor).

17. Regarding **claim 2**, Guidash also teaches the first pixel (40 at row B column 2; Fig. 5) is formed without the amplifier transistor (21; Fig. 5), and the second pixel (40 at row A column 1; Fig. 5) is formed without the reset transistor (15; Fig. 5).

18. Regarding **claim 3**, Guidash also teaches the solid-state imaging apparatus of claim 1, wherein the plurality of pixels are arranged in a one-dimensional or two-dimensional manner such that the distance between the centers of the photodiodes (52s) in each adjacent two of the plurality of pixels along the direction of alignment thereof is fixed (see Fig. 6).

19. Regarding **claim 4**, Guidash also teaches the first (40 at row B column 2; Fig. 5) and second pixels (40 at row A column 1; Fig. 5) have the same shape and size (see Fig. 5), and the location of the gate electrode of the reset transistor (RG, 15) in the first pixel (40 at row B column 2; Fig. 5) is the same as that of the gate electrode of the amplifier transistor (SIG, 21) in the second pixel (40 at row A column 1; Fig. 5).

20. Regarding **claim 5**, Guidash also teaches a first contact connected to the reset transistor (the small square on the top of RG; Fig 5); and a second contact connected to the amplifier transistor (the small square on the top of SIG), wherein the location of the first contact in the first pixel (40 at row B column 2; Fig. 5) is the same as that of the second contact in the second pixel (40 at row A column 1; Fig. 5).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

23. **Claims 6 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Guidash as applied to claims 1 and 4 above, and further in view of Lee et al. (US 2004/0140564 A1).

24. Guidash teaches, regarding to **claim 6**, a first contact connected to the reset transistor (the small square on the top of RG; Fig 5); and a second contact connected to the amplifier transistor (the small square on the top of SIG; Fig 5).

Guidash does not teach, regarding to **claim 6**, the first and the second contacts are of metal, and regarding to **claim 7**, an interlayer insulating film formed on the pixels; and a microlens formed on a part of the interlayer insulating film located immediately above the photodiode.

In the same field of endeavor of CMOS imager, Lee et al. teach, regarding to **claim 6**, the first and the second contacts are of metal (contacts 140 formed of copper; Fig. 1, paragraph [0062]), and regarding to **claim 7**, an interlayer insulating film (first interlayer dielectric layer 130; Fig. 1, paragraph [0062]) formed on the pixels (the area of p/n photodiode 110; Fig. 1; paragraph [0063]); and a microlens (lens 310; Fig. 1, paragraph [0064]) formed on a part of the interlayer insulating film (130) located immediately above the photodiode (110; see Fig. 1). Lee et al. also teach that this is a photodiode image sensor in a copper interconnection system and copper is the material of interconnects where the design rule is below 0.13 μm (paragraph [0002, 0006]).

It would have been obvious to one of ordinary skill in the art at the time of invention was made to combine the inventions of Guidash and Lee et al. and use the copper contacts and microlens as taught by Lee et al., because we can build a image sensor in a system where the design rule is below 0.13 μm (paragraph [0002, 0006]) as taught by Lee et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsin-Yi (Steven) Hsieh whose telephone number is 571-270-3043. The examiner can normally be reached on Monday to Friday.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HH
10/25/2007


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